UJNR Marine Facilities Panel

Study Tour -- 23rd Meeting

Tuesday, May 9

- Arrival at Kansai International Airport. Kansai is Osaka's air transport gateway constructed on a manmade island. This facility opened in September 1994 as Japan's first 24 hour airport.

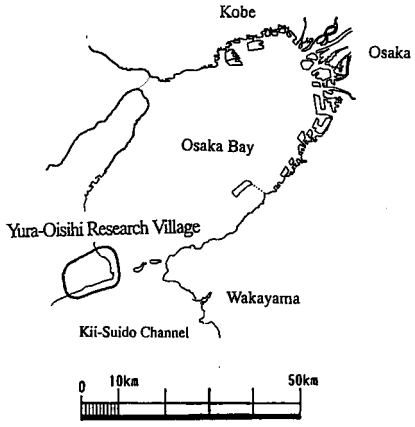
- K-JET Hydrofoil: 80-85kM/Hr for 25 minute trip from Kansai International Airport to Port Island, Kobe the location of the Portopia Hotel.

- Toyota RAV ZEV (ZERO Emissions Vehicle) all electric vehicle with a range of 40-60 miles, top speed 70 mph, Ni-MHD batteries, 6 hour recharge at 110v. This electric car was located at the Portopia Hotel for promotion and demo drive purposes.

Wednesday, May 10

- Akashi Kaikyo Great Bridge, the "Pearl Bridge." This is a 3920M long three span suspension bridge with a center span of 1990M. This bridge is the longest suspension bridge in the world. Construction was begun in 1988 and was opened in 1999. The Humber Bridge in England is the second longest bridge having a center span of 1410M.

- Yura – Oishi Environmental Center on Awaji Island, Sumoto City via Pearl Bridge. This Center is located at the mouth of Osaka Bay on the Kii-Suido Channel. 300,000 ships pass this channel annually. Welcome by the city mayor, Mr. Keiichi Nakagawa and Center Managing Director, Dr. Buichiro Murata. Dr. Ryusuke Hosoda discussed the acquaculture of using the nearby deep water nutrients from deep water nearby to rebuild the near shore area. One technical paper was distributed with video naration; "The Ecological Development of Yura-Oishi Research Village in the Southern Area of Sumoto City."



- Visited the Awaji Kyodo Zousen shipyard in Sumoto City. This is a relatively small shipyard having the capacity to perform a wide variety of projects. These include barges and crane barges, tugboats,

- Boat tour of the port of Kobe compliments of the Port and Harbor Bureau, Kobe Port Terminal Corporation. The port has 38 container handling berths and is expanding by building islands for additional facilities, Port and Rokko Islands. The post can accommodate as many as 200 large ships at one time. Most of the extensive damage to the port from the 1995 earthquake has been repaired. In 1998 the port handled 4595 container ships with 107,014,558 tons of containers.

- Visit to Mitsui O.S.K. Lines Kobe International Container Terminal supporting Port Island Container Berths 14 &15.This state of the art facility can accommodate the largest containerships. It has a water depth of 15M and five overpanamax 40 ton gantry cranes in addition to the 14 transfer cranes for loading trailers. These cranes have automatic operation and sway control. It employs the lateste computerized yard control system to insure the most efficient handling of containers.

Thursday, May 11

- Visit to Hitachi Zosen Dockyards to see the construction of the Movable Floating Bridge in Osaka. The main function of the bridge is to connect two reclaimed islands across a waterway for the continued development of these

islands. This bridge will swing open to provide access for large ships should the main harbor entrance not be available. The construction time and cost for this bridge is reduced because the erection is done in a dock by the temporary support method and the almost completed bridge will be towed to the erection site by tugboats. This structure has a total length of 940M and width of 38.4M with six lanes. The floating par has the length of 410M and the main span length of 280M with double arch rig construction standing on two steel hollow pontoons. Transitional bridges are installed at both ends to connect the floating bridge to the bridge approach. The two pontoons can swing around a pivot near one end. The bridge is swung around the axis by tugboats.

- Port of Osaka tour compliments of the Oaska Municipal Government and the City Port Authority. This port serves the city as the gateway for its waterborne traffic. To the south is the City of Sakai with Yamato River flowing between; an its north lies Hyogo Prefecture beyond the Kanzaki River.

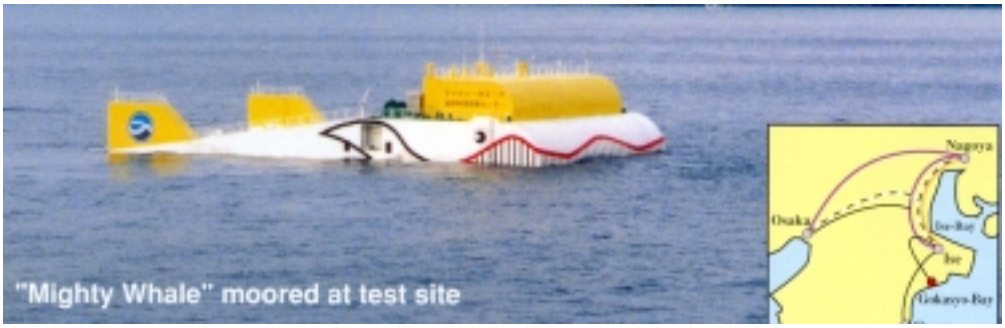
  This port receives around 6400 international vessels annually. Its container services receives around 3800 containerized vessels and 17 million tons of cargo annually. The number and gross tonnage of ships for the port for 1998 are 6389 ocean going ships, (84 million tons), and 4725 coastal ships (40 million tons)

Osaka City PR Boat “Yumesaki” (Blooming Dream)

- Traditional Japanese dinner at the Thalassa Hotel consisting of Okira jelly cake, Sillago, Japanese pickles, individual grilled beef with soy sauce and bonito stock, Miso soup, etc.

Friday, May 12

- Visit by boat to JAMSTEC Offshore Floating Wave Power Device, “Mighty Whale” located at the mouth of Gaskasho Bay off Nansei Town.Visit included the land based center for monitoring via microwave the Mighty whale performance. Our host was Mr. Yukihisa Washio.



Mighty Whale is a prototype unmanned offshore floating electric power generating device. The principals of operation are: a) Waves cause the water level in the air chambers to rise and fall, b) the increase in air pressure creates a high speed airflow through the air turbine, and c) the turbine drives a generator producing electric power. The maximum power output is 110kW. The Mighty Whale is 50M X 30M having a 12M draft and displacement of 4380 tons. It is secured via a six point mooring system in 40 meters of water depth and roughly two kilometers offshore. The system operates automatically and operation is monitored by a telemetry system to a shore based instrumentation system.

- Visit to Aquaculture Research Center experimenting with acoustic fish farming in an open ocean environment. A pair of instrumented buoys emit an acoustic signal seven times daily at two hour intervals. Buoys have a sonar type instrumentation to count and classify fish responding to the signal. This system was developed by JAMSTEC Marine Ecosystems Research Dept. A technical paper by M. Okamoto, N. Takatsu, and W. Koterayama was distributed.

Inshore Submersible Platform – Surfaced Condition

- Visit to the National Research Institute of Aquaculture hosted by Dr. Kunihiko Fukusho, Director (and member of the UJNR Aquaculture Panel). Dr. Fukusho presented an overview and copies of his paper, "Red Sea Bream Culture." This research center was constructed on 1984 on Gakasho Bay. Ind includes facilites to support experiments relevant to the rapidly expanding fish farming industries as well as to the intensification of fishery production. The "Annual Report on Japan's Fisheries for 1998" was distributed.

Saturday, May 13

- Walking tour of the Ise Jingu Shrine, the most honored place among all Shinto sanctuaries and is considered to be the spiritual home of the Japanese people most of whom wish to make a pilgrimage to Jingu at least once during their lifetime. The Shrine is the home of the ancestral goddess of the imperial family. More than six million pilgrims and worshipers come to Jingu every year.

- Visit to Ise Sengoku Jidaimura, a theme park that reproduces the streets of the 1568 –1800 period in Japan history. This is presented by various dramas and building reproductions. The Grand Ninja Theater presented a drama about the persecution of Nichiren, the Buddhist monk wo founded the Nichiren sect, a Japanese Biddhist sect.

- Pearl Island. This small island in Toba Bay is where Mikimoto Kokichi first succeeded in producing a cultured pearl in 1893. The island forms a pearl museum including demonstrations of pearl diving and seeding the oysters. .

Sunday, May 14

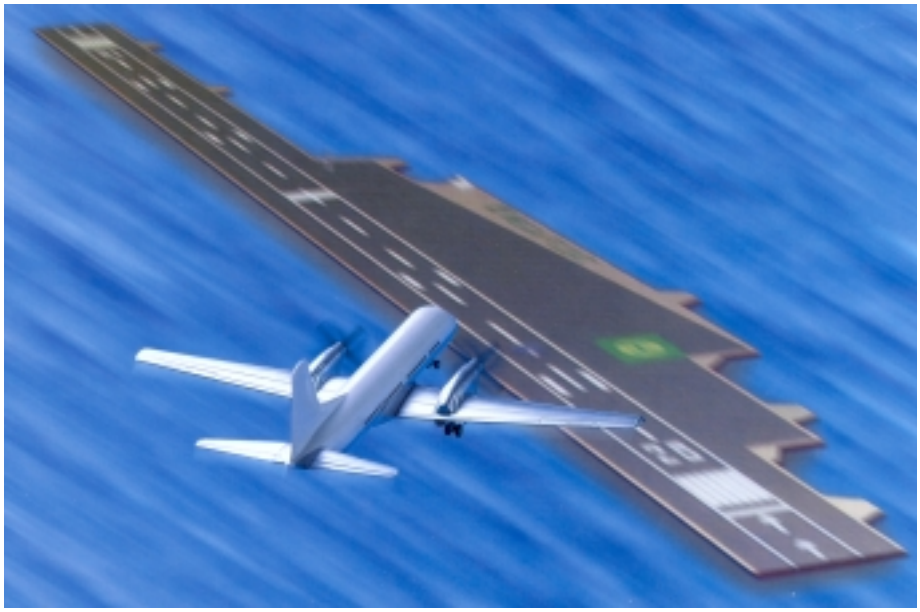
- Visit to Nagoya Castle. This castle was built in 1610 by order of Tokugawa Leyasu. It features a five storied ferroconcrete donjon 48M high and mounted with a pair of golden mythical fish or dolphins. It is said that the first dolphin to adorn the main ridge of the castle roof was added when the basic construction was completed (1334-1400) and was a symbol of the feudal lord's authority. During the war the castle was burned and was rebuilt in 1959. Currently it is a museum of art treasures.

- Visit to the Tokugawa Art Museum in Nagoya. Opened in 1935, it contains more than 10,000 paintings, swords, tea ceremony articles, dyed fabrics, craft items, etc, handed down from the Owari Tokugawa family, a feudan lord.

- High speed train from Nagoya to Tokyo

Monday, May 15

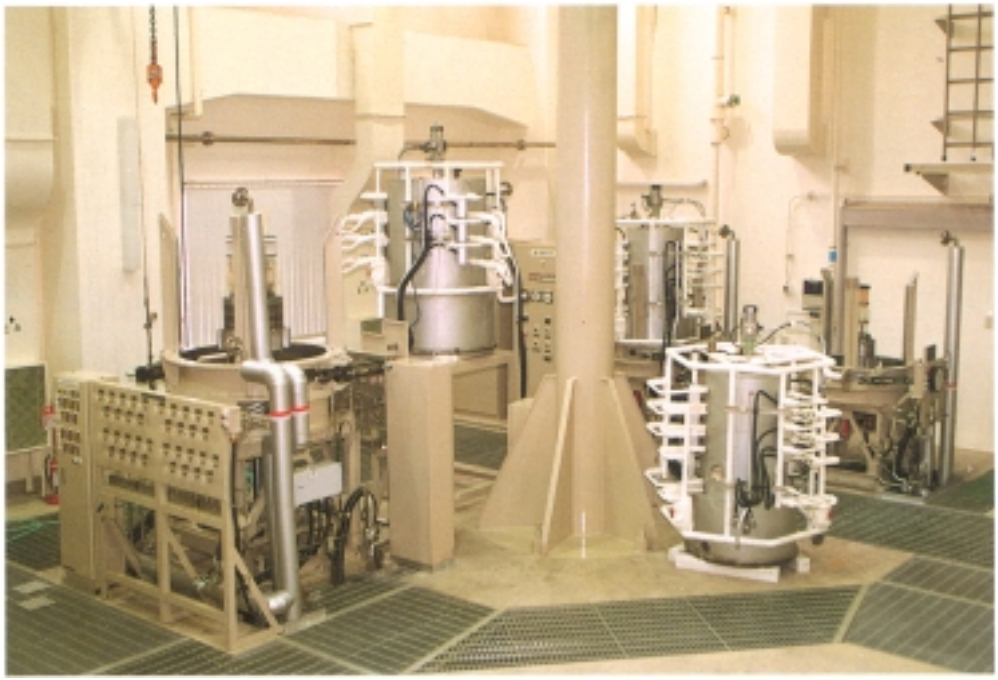
- Ultra-large Floating Structure, MEGA-FLOAT, VISIT BY BOAT TO THE technological Research Association of Mega-Float. Mega-Float is a 1000M long by 60M wide (partly 121M) floating offshore platform developed as a research demonstration project. The displacement is 40,000 tons. Phase II of this project will be completed this year with the installation of an aircraft ILS landing system and an aircraft take-off and landing experiment. The Mega-Float platform is a prototype for an airport, energy facility, emergency response base and a port facility.



- JAMSTEC, Japan Marine Science & Technology Center. Presented and visited several submersibles including SHINKAI 6500, KAIKO 10.000, UROV7K, and AUV RASHIMA 3500. During the past eight years JAMSTEC have been exploring the deep ocean using these submersibles. These systems were all available for inspection. Included was a mock-up of the 5kW fuel cell power system using many actual components.

A presentation was given on JAMSTECs new deep sea drilling vessel. This is a state of the art vessel equipped to drill 7000M beneath the seabed, depth 4000M for a total drilling system for 11,000M.

Visited laboratories for 'Bio-diversity in the deepest sea of the Mariana Trench' and development of an offshore type submersible platform for



mariculture. The bio-diversity lab have isolated and analyzed the properties of 3000 microbial strains from the Mariana's Trench. These strains grow only at pressures greater than 600 atmospheres and cold temperatures. These specimens are collected by a the 'DEEP BATH' system, Deep-sea, Baro/Thermopohiles Collecting and Cultivating System. This system keeps and cultivates specimens in the same environmental conditions in which they naturally grow in the deep sea.

- IHI Heavy Industries Tokyo R&D Facilities. Dr. Tadaaki Yamazaki Managing Director, & Dr. Junichi Sato General Manager, Technical Department. Visits to laboratories of Ship Maneuvering Simulator, Advanced Underwater Inspection RPV, and Molten Carbonate Fuel Cell.

Tuesday, May 16

- IHI Heavy Industries Yokohama Technical Development Headquarters. Host was Dr. Mizoguchi. Visits to laboratories for Three Dimensional Seismic Simulator, Thermally Stratified Wind Tunnel, Ship Towing Tank, and Seakeeping and Maneuvering Tank. A hybrid anti roll ship roll stabilization system was briefed and papers distributed.

- IHI Research Institute Tokyo, Host was Dr. T. Yamazaki, General Manager for Technical Development. Briefings on a) the 125kW stack of molten carbonate fuel cell and the 60kW plate reformer for natural gas or coal gas, b) AIRIS 21, a system for the underwater inspection of welds in nuclear pressure vessels. Technical papers were distributed.

End of Study Tour